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Comparison between natural infection by *Cryptosporidium* sp., *Giardia* sp. in dogs in two living situations in the West Zone of the municipality of Rio de Janeiro

F. Huber, T.C.B. Bomfim *, R.S. Gomes

Veterinary Parasitology, BR 465, Km 7, Universidade Federal Rural do Rio de Janeiro, Seropédica, Rio de Janeiro, CEP 23890-000, Brazil

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Abstract

In order to compare natural infection by *Cyptosporidium* sp. and *Giardia* sp. in clinically healthy dogs living in two situations (animal shelter and household pets), we conducted 166 faecal exams using the technique of centrifugation–flotation in a sugar-saturated solution. Of the faecal samples, 94 came from shelter dogs and 72 from house pets. Eighty-two (49.4%) contained parasite eggs, cysts or oocysts. Of these, four (2.41%) contained *Cryptosporidium* sp. oocysts and 52 (31.33%) contained *Giardia* sp. cysts. There was no statistically significant difference between the origin of the dogs and *Cryptosporidium* sp. infection. Infection by *Cryptosporidium* sp. was not associated with the living conditions and sex. With respect to *Giardia* sp., we observed a statistically significant difference ($p < 0.001$) between the shelter dogs (45%) and the household pets 12.3%. There was no association of infection by *Giardia* sp. with age or sex.
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Keywords: *Cryptosporidium* sp.; *Giardia* sp.; Dogs; Shelter; House pets

1. Introduction

Giardia and *Cryptosporidium* are opportunistic protozoan parasites that may infect animals and humans, causing assintomatic to severe intestinal infections, according to the immunological capacities of their hosts. It is commonly accepted that both have low host specificity, qualifying them as zoonoses.

Morgan et al. (2000) identified and genetically described a canine genotype of *Cryptosporidium*. This genotype, besides infecting dogs, has been detected in the faeces of adult humans with compromised immune systems (Xiao et al., 2001) and was published as new species, *Cryptosporidium canis*, by Fayer et al. (2001).

Clinical gardiasis in dogs is mentioned associated with dogs in kennels, witch may be an important source of contamination for house dogs (Barr et al., 1993).

There are still relatively few studies in Brazil of infection of dogs with *Cryptosporidium* sp. and

* Corresponding author. Tel.: +55 21 2682 1617; fax: +55 21 2682 1617.
E-mail address: tcbb@ufrrj.br (T.C.B. Bomfim).

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Giardia sp., more specifically on the infection of apparently healthy dogs. The objective of this study was to compare infection by *Cryptosporidium* sp. and *Giardia* sp. in apparently healthy dogs maintained in different environmental situations.

2. Materials and methods

In the present study, we collected faecal samples of dogs kept in a shelter located in the West Zone of the municipality of Rio de Janeiro, Brazil and also from house pets in the same region.

The shelter maintained about 250 dogs, subdivided into six large collective kennels. Fifteen animals were kept in individual enclosures. The dogs maintained in the shelter were stray dogs collected by the public sanitary service.

Ninety-four faecal samples, representing 34.33% of the dogs at the shelter, were collected. Only freshly passed faeces were collected, taking care to avoid the part of the deposit in contact with the ground. The samples were placed in plastic bags, each identified with the kennel of origin. Diarrheic faeces and those that had been stepped on were not collected. To minimize the possibility of repeated collection of faecal samples from the same animal, the collection was done a single time in each kennel, from points as widely spaced as possible.

Faecal samples were placed in an ice chest and taken to the Protozoology Laboratory of the Animal Parasitology Department of the Universidade Federal Rural do Rio de Janeiro (UFRRJ), for processing.

Collection of faecal samples from the pet dogs was undertaken through the intermediation of a private veterinary clinic at the animal shelter site itself. Seventy-two faecal samples collected, came from apparently healthy pets who showed no external signs or symptoms of illness or known diseases.

We considered house pets as dogs that were kept contained in the areas of residences (house and/or yard) for at least 12 h a day, and allowed in the streets part of the day, either alone or accompanied by their owners. The faeces were collected and placed in plastic jars with threaded tops, each recipient identified as to origin.

In the laboratory, the samples were registered and approximately 8 g of each sample were homogenized with 30 ml of distilled water, and thereafter filtered through fine plastic discardable sieves with an overlay of gauze. After this filtering, the faecal material was divided in two conical test tubes and centrifuged at 402.48 × *g* for 10 min. The supernatant was discarded and added 2.5% potassium dichromate solution to the sediment of one of the tubes.

Saturated sugar solution, with a specific density of 1.30 g/ml, was added to the remaining sediment in the second tube and, after homogenization, centrifuged 402.48 × *g* for 5 min. The tube was topped up with sugar solution and covered with a slide cover slip and left at rest for three minutes. The cover slip was mounted on a slide and examined under an Olympus BX 51 binocular microscope at 40×, with phase contrast, using the 100× objective to confirm visualization of the protozoans.

To compare the infection rates between shelter and household dogs, between age ranges and between males and females, were used the Chi-square test. In cases where the number of observations was less than 15 positive cases, the Fisher exact test was employed. The statistical program used was Statcalc from EPInfo, an epidemiological program from the Center for Disease Control and Prevention-CDC (Dean et al., 2000).

The percentage oocyst and cyst recovery efficiency of the method employed for the concentration and detection was tested using control contaminated dog faeces. Approximately 1500 *Cryptosporidium* oocysts and 2300 *Giardia* cysts were added to 4 g dog faeces (previously found to be negative for *Cryptosporidium* and *Giardia*) resulting in recovery efficiency of 100% ($n = 10$). Using less oocysts and cysts, the recovery efficiency decreased, reaching 50% when using ca. 400 *Cryptosporidium* oocysts and 1100 *Giardia* cysts in 4 g dog faeces ($n = 10$).

3. Results

Of 166 faecal samples, 82 (49.4%) presented no type of parasitism and 84 (50.6%) of the samples contained helminth eggs or protozoan oocysts or cysts. Four samples (2.41%) contained *Cryptosporidium* sp. oocysts and 52 (31.33%) contained *Giardia* sp. cysts. Nine (12.3%) of the household dogs were eliminating cysts of *Giardia* sp. in their faeces, while 43 (45.74%) of the shelter dogs were infected. In this study, we

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